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SPECIAL CHALLENGES TO WATER MARKETS IN RIPARIAN STATES

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INTRODUCTION

Georgia, especially the Atlanta region, has encountered recurring and increasingly severe droughts.[1] Phenomenal growth has compounded the water shortage problem.[2] Georgia has also become embroiled in legal disputes with neighboring states over their shared water resources.[3] Even the arrival of ample rains did not end water restrictions in Georgia.[4] Georgia's regulated riparian regime should have facilitated its response.[5] Yet Georgia's regulated riparian regime

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1. *See* Will Anderson, *Waking Up—to Water: Residents Forced to Adapt to Routine in Response to the Relentless Drought Crippling the North Georgia Area*, ATLANTA J. CONST., June 15, 2000, at B1; Richard Lezin Jones, *Report from Georgia: Southeast Panting, Before the Dog Days: A Drought Three Summers Old Has Georgia, Especially, Parched, as August, Like a Reaper, Awaits*, PHILA. INQUIRER, July 16, 2000, at A3; Charles Seabrook, *How Low? Georgia Rivers Flow at a Trickle as Drought Digs in for Summer. The Impact Could Be Dire*, ATLANTA J. CONST., June 11, 2000, at F1; Maurice Tamman, *Georgia Clay Taking After Sahara Sand; Drier than Dust: Parts of Peach State Approaching Desert Like Conditions, with Rest Headed That Way*, ATLANTA J. CONST., June 3, 2000, at E6.

2. John L. Fortuna, Note, *Water Rights, Public Resources, and Private Commodoties: Examining the Current and Future Law Governing Allocation of Georgia Water*, 38 GA. L. REV. 1009, 1009 (2004); Dustin S. Stephenson, *The Tri-State Compact: Falling Waters and Finding Opportunities*, 16 J. LAND USE & ENVTL. L. 83, 85-87 (2000).

3. *See* David Copas, Jr., Note, *The Southeastern Water Compact, Panacea or Pandora's Box? A Law and Economics Analysis of the Viability of Interstate Water Compacts*, 21 WM. & MARY ENVTL. L. & POL'Y REV. 697 (1997); Joseph W. Dellapenna, *The Southeastern Compacts*, *in* 1 WATERS AND WATER RIGHTS 9-208 to 9-213 (Robert E. Beck ed., 2001 repl. vol.); Joseph W. Dellapenna, *Interstate Struggles Over Rivers: The Southeastern States and the Struggles Over the 'Hooch*, 13 N.Y.U. ENVTL. L.J. (forthcoming 2004); Mary Hawk, Note, *Interstate Compacts: Allocate Surface Water Resources from the Alabama-Coosa-Tallapoosa River Basin between Georgia and Alabama; Allocate Surface Water Resources from the Apalachicola-Chattahoochee-Flint River Basin among Alabama, Florida, and Georgia*, 14 GA. ST. U. L. REV. 47 (1997); J.B. Ruhl, *Equitable Allocation of Ecosystem Services: A New Water Law for a New Age*, 19 J. LAND USE & ENVT'L L. 47 (2003); Stephenson, *supra* note 2.

4. *See* Stacy Shelton, *Permanent Restrictions Set on Outdoor Watering*, ATLANTA J. CONST., May 27, 2004, at C3.

5. O.C.G.A. §§ 12-5-31, 12-5-90 to 12-5-107 (2001); *see* James L. Bross, *Georgia*, *in* 6 WATERS AND WATER RIGHTS 301, 306-07 (Robert E. Beck ed., 2001 repl. vol.); *see* Joseph W. Dellapenna, *The Law of Water Allocation in the Southeastern States at the Opening of the Twenty-First Century*, 25 U.

is in some respects undeveloped; in particular, it exempts nearly all "farm uses" from its regulatory requirements.[6] Thus, the underlying legal regime, based upon traditional riparian rights, remains important in Georgia.[7] The resulting complexity of the water law in the State is an impediment to the flexibility necessary for the most efficient and effective response to these growing problems.

In response to the lack of flexibility in Georgia's water management regime, the introduction of markets became a major political issue in Georgia at the turn of the twenty-first century when the Georgia Legislature established a Joint Comprehensive Water Plan Study Committee to consider changes to the State's existing water law.[8] In its final 2002 report, the Committee proposed a bill that would have expressly authorized "permit trading" for water permits.[9] This aspect of the bill became controversial, with the business sector supporting the introduction of markets and with environmental activists opposing it.[10] At the last minute, the Georgia Senate stripped the market provisions out of the bill by a vote of 45 to 6.[11] This led to the defeat of the entire bill, leaving Georgia with no water law reform at all.[12] Although supporters of water markets in

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ARK. LITTLE ROCK L. REV. 9, 68-73 (2002) [hereinafter Dellapenna, *Water Allocation*]; Fortuna, *supra* note 2, at 1013-15, 1033-37, 1039-41. For a discussion of regulated riparianism generally, see *infra* Part II.C.

6. O.C.G.A. §§ 12-5-31(a)(3), 12-5-105(a) (2001). "Farm uses" include water used for growing any crop (including turf, trees, and ornamental plants), for aquaculture or animal husbandry, or for the processing of perishable agricultural products. O.C.G.A. §§ 12-5-31(b)(3), 12-5-92(5.1) (2001).

7. *See* O.C.G.A. §§ 44-8-1 (2002), 51-9-7 (2000); Stewart v. Bridges, 292 S.E.2d 702, 704 (Ga. 1982); Pyle v. Gilbert, 265 S.E.2d 584, 586 (Ga. 1980); Bracey v. King, 406 S.E.2d 265, 265 (Ga. Ct. App. 1991). *See generally* Bross, *supra* note 5, at 302; Dellapenna, *Water Allocation*, *supra* note 5, at 65-67.

8. *See* JOINT COMPREHENSIVE WATER PLAN STUDY COMM., FINAL REPORT (2002), *available at* www.cviog.uga.edu/water/finalreport/pdf [hereinafter FINAL REPORT]. The parent website of the Carl Vinson Institute of Government at the University of Georgia contains numerous documents pertaining to the work of the Committee. Carl Vinson Institute of Government, *at* http://www.cviog.uga.edu/.

9. FINAL REPORT, *supra* note 8, at 9-10. See H.B. 237, 147th Gen. Assem., Reg. Sess. (Ga. 2004) for the version, passed in 2004, which did not include permit trading. *See* Fortuna, *supra* note 2, at 1011-12, 1015-16, 1041-42, 1051-63; Dave Williams, *Activists Fight Bill on Water Transfers*, AUGUSTA CHRON., Mar. 24, 2003, at B9.

10. *See, e.g.*, Williams, *supra* note 9.

11. Dave Williams, *Georgia Senate Strips Permit Trading from Water Bill*, KNIGHT-RIDDER TRIB. BUS. NEWS, Apr. 18, 2003, *available at* 2003 WL 18826617.

12. *See* Heather Duncan, *Legislators Can't Agree on Water-Permit Sales*, MACON TELEGRAPH, Apr. 24, 2003, at 5; Stacy Shelton, *Legislature 2003: House Shoots Down Water Permit Sales*, ATLANTA J.

Georgia have not given up,[13] resistance to markets in Georgia has grown since the proposal's defeat.[14] Not until May 2004, more than a year after the first bill failed, was Georgia able to enact a program to create a comprehensive state water plan, which might, in several more years, lead to future water law reform.[15]

The Georgia Legislature has already experimented with what some have described as a "market" in the Flint River Basin in the southwestern part of the State.[16] That experiment arose when intense drought caused farmers to withdraw so much water from the Flint River that it was in danger of drying up.[17] The Georgia Legislature reacted by passing the Flint River Drought Protection Act in 2000, which provided for substantial cash payments to farmers in the Basin who forego pumping water from the river and its tributaries for the duration of the drought.[18] Several thousand farmers signed up to receive, in the aggregate, more than $5,000,000.[19] As a result, direct withdrawals from the river and its tributaries declined substantially.[20] None of these measures helped to preserve minimum flows in the included rivers.[21] More important than press reports of irregularities in the administration of the payments (involving the denial of payments to eligible farmers and the making of payments to

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CONST., Apr. 26, 2003, at G5; Stacy Shelton, *Legislature 2003: Other Key Issues from the Session: Water*, ATLANTA J. CONST., Apr. 27, 2003, at C9; Kristen Wyatt, *Georgia Left with No Water Plan After Bill Falters*, COLUMBUS LEDGER-ENQUIRER, May 4, 2003, *available at* http://www.gwf.org/gawater/may4.html (last visited Jan. 6, 2005).

13. *See, e.g.*, GA. PUB. POL'Y FOUND., WATER PERMIT TRANSFERS: BRIDGING THE MISINFORMATION GAP (2003), *available at* www.gppf.org/pub/Water/waterpermittransfers_2.pdf. *See also* Fortuna, *supra* note 2, at 1011-12.

14. *See, e.g.*, Bryan Brasher, *Cities Reject Water Permit Trading*, COLUMBUS LEDGER-ENQUIRER, Jan. 23, 2004, *available at* 2004 WL 57206572 (reporting that more than 100 cities and counties in Georgia have adopted a resolution against markets for water).

15. *See* David Williams Morris, *Assembly Approves Water Bill*, AUGUSTA CHRON., Apr. 9, 2004, at B5; Stacey Shelton, *Water Compromise Gives Legislature Role in Policy*, ATLANTA J. CONST., Apr. 1, 2004, at C8; Stacey Shelton, *Perdue Signs off on Water Law*, ATLANTA J. CONST., May 14, 2004, at C3.

16. *See* GA. PUB. POL'Y FOUND., *supra* note 13, at 3-4; Dellapenna, *Water Allocation*, *supra* note 5, at 70-71.

17. *See* GA. PUB. POL'Y FOUND., *supra* note 13, at 3-4.

18. O.C.G.A. §§ 12-5-540 to -550 (2001).

19. GA. PUB. POL'Y FOUND., *supra* note 13, at 4.

20. *Id.* at 4.

21. *Id.*

ineligible farmers),[22] was the failure of the Act to regulate pumping from wells within the Basin. Pumping from wells increased more than the decrease in direct withdrawals from the surface waters, with the predictable result that the water levels in the covered rivers continued to drop precipitously.[23]

When a market works, it is the most efficient mechanism for allocating resources to particular uses, but that system fails if there are significant barriers to the functioning of a market.[24] The experience with the Flint River Drought Protection Act suggests at the least that one must carefully design any attempt to introduce water markets into a riparian jurisdiction, or the law will contradict, rather than achieve, its professed goals. In this Article, however, I explore certain special challenges that will make it difficult or impossible to use markets as a water management tool in a riparian jurisdiction.

I. WHY MARKETS FOR WATER FAIL

The central problem with using markets as a water management tool is that water is a "public good."[25] Some now argue that water is not a public good.[26] Which view is right? Public goods share two qualities: indivisibility and publicness.[27] Because public goods are

22. Will Anderson, *Flint River Farmers Bid in Water-Saving Plan*, ATLANTA J. CONST., Mar. 18, 2001, at C3; Richard Whitt & Julie C. Hariston, *Farmers Feel Sting of Water Payoffs*, ATLANTA J. CONST., May 2, 2000, at 1B.

23. GA. PUB. POL'Y FOUND., *supra* note 13, at 3.

24. *See generally* Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960) (the classic economic analysis of how markets work and why they fail).

25. *See* Joseph W. Dellapenna, *The Importance of Getting Names Right: The Myth of Markets for Water*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 317, 329-36 (2000) [hereinafter Dellapenna, *Getting Names Right*]; John S. Harbison, *Waist Deep in the Big Muddy: Property Rights, Public Values, and Instream Waters*, 26 LAND & WATER L. REV. 535, 546-49 (1991); Douglas R. Williams, *Valuing Natural Environments: Compensation, Market Norms, and the Idea of Public Goods*, 27 CONN. L. REV. 365, 388-90 (1995). *See generally* GLOBAL PUBLIC GOODS: INTERNATIONAL COOPERATION IN THE 21ST CENTURY (Inge Kaul et al. eds., 1999) [hereinafter GLOBAL PUBLIC GOODS].

26. *See, e.g.*, TERRY L. ANDERSON & PAMELA SNYDER, WATER MARKETS: PRIMING THE INVISIBLE PUMP 113-14 (1997).

27. *See* ANDERSON & SNYDER, *supra* note 26, at 112-13; GLOBAL PUBLIC GOODS, *supra* note 25; STEPHEN J.K. WALTERS, ENTERPRISE, GOVERNMENT, AND THE PUBLIC (1993); Niva Elkin-Koren & Eli M. Salzberger, *Law and Economics in Cyberspace*, 19 INT'L REV. L. & ECON. 553, 559 (1999); Harbison, *supra* note 25, at 547.

indivisible, one cannot divide the goods up or buy as much as one wants, and one cannot keep others from accessing and enjoying the goods as long as anyone can access and enjoy them.[28] How can you stop others from viewing the blue sky over your property? In sum, a public good is one that all within the relevant public must enjoy more or less equally, or no one can enjoy the good at all.[29]

Generally, public goods must be free goods because one cannot exclude consumers from enjoying the goods.[30] The only costs, if any, associated with a public good are the costs of capture, transportation, and delivery, not a cost for the good itself.[31] If you invest in developing or improving a public good, others who invest or pay nothing will enjoy the benefits of your investment.[32] These "free riders" seriously inhibit investment unless the government, or some other institution, is able to assure that all parties pay for the benefits they receive.[33] The market alone simply will not work; regulation will.

Water is not strictly indivisible and public.[34] Bottled water, for example, is a private good.[35] This example, however, does not resolve whether raw water—water in bulk in its natural condition—is a public good. After all, even economists who argue that water is not a public good use water metaphors when discussing what they concede to be public goods: "common pool resource" and "spill over effects."[36] Moreover, society treats some things as public goods because of their social and economic characteristics rather than just

28. *See* Dellapenna, *Getting Names Right*, *supra* note 25, at 330.

29. *Id.*

30. *Id.*; John O. Ledyard, *Market Failure*, *in* THE NEW PALGRAVE: ALLOCATION, INFORMATION AND MARKETS 185 (John Eatwell et al. eds., 1989). *See generally* PUBLIC GOODS AND MARKET FAILURES: A CRITICAL EXAMINATION (Tyler Cowen ed., 1992).

31. Dellapenna, *Getting Names Right*, *supra* note 25, at 330.

32. *See, e.g.*, Mehmet Bac, *Incomplete Information and Incentives to Free Ride on International Environmental Resources*, 30 J. ENVTL. ECON. & MNGT. 301 (1996); Ramzi Suleiman, *Provision of Step-Level Public Goods Under Uncertainty: A Theoretical Analysis*, 9 RATIONALITY & SOC'Y 163, 163-64 (1997).

33. Dellapenna, *Getting Names Right*, *supra* note 25, at 330.

34. *Id.* at 331; Fortuna, *supra* note 2, at 1017.

35. *See, e.g.*, Matt Berkowitz, Comment, *Bottling the Water Bottlers: A Critique of Pennsylvania Groundwater Law*, 22 TEMPLE ENVTL. L. & TECH. J. 235 (2004).

36. *See* Dellapenna, *Getting Names Right*, *supra* note 25, at 329.

their physical characteristics.[37] If transaction costs are so high that no market can function with even minimal effectiveness,[38] or if society's values require that all receive a "fair" share of the resource, or at least that individuals have access to the good and not be denied because of inability to pay, society will treat it as a public good.[39] Such goods could be termed socially created public goods.[40]

Water is a commodity for which transaction costs are too high to allow large-scale markets, and its importance to human life precludes denying access to those who cannot pay for it.[41] Transaction costs alone will explain why water is a public good; markets for all but the smallest water bodies quickly become cost prohibitive.[42] Transfers of water on a large scale affect many people, making it difficult to procure the contractual assent of all significantly affected persons. Those who advocate that recourse to private markets should be the prime means for protecting instream values miss the point entirely.[43]

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37. *Id.* at 333.

38. Uijayant Chakrvorty, Eithan Hochman, & David Zilberman, *A Spatial Model of Water Conveyance*, 29 J. ENVTL. ECON. & MGT. 25 (1995); Charles W. Howe et al., *Transaction Costs as a Determinant of Water Transfers*, 61 U. COLO. L. REV. 393 (1990). *See generally* NEIL K. KOMESAR, IMPERFECT ALTERNATIVES 19-26 (1994); RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW § 3.11, at 87-88 (5th ed. 1998); Harbison, *supra* note 25, at 544-46.

39. Dellapenna, *Getting Names Right*, *supra* note 25, at 333-34. *See generally* Neil Duxbury, *Law, Markets, and Valuation*, 61 BROOK. L. REV. 657 (1995); Thomas W. Merrill, Dolan v. City of Tigard: *Constitutional Rights as Public Goods*, 72 DENV. U. L. REV. 859 (1995).

40. Dellapenna, *Getting Names Right*, *supra* note 25, at 333; Fortuna, *supra* note 2, at 1017. For example, consider public education. *See generally* CHANGING URBAN EDUCATION (Clarence N. Stone ed., 1998); JEFFREY R. HENIG, RETHINKING SCHOOL CHOICE: LIMITS ON THE MARKET METAPHOR (1994); LAW AND SCHOOL REFORM: SIX STRATEGIES FOR PROMOTING EDUCATIONAL EQUITY (Jay P. Heubert ed., 1999); VOUCHERS FOR SCHOOL CHOICE: CHALLENGE OR OPPORTUNITY? AN AMERICAN JEWISH REAPPRAISAL (Marshall J. Berger & David M. Gordis eds., 1998).

41. *See* Dellapenna, *Getting Names Right*, *supra* note 25, at 333-35.

42. See the text *infra* at notes 141-51.

43. For such advocates, see ANDERSON & SNYDER, *supra* note 26, at 114-16; Ronald C. Griffin & Shin-Hsun Hsu, *The Potential for Water Market Efficiency When Instream Flows Have Value*, 75 AM. J. AGRIC. ECON. 292 (1993); James L. Huffman, *Markets, Regulations, and Environmental Protection*, 55 MONT. L. REV. 425 (1994); Ronald A. Kaiser & Shane Binion, *Untying the Gordion Knot: Negotiated Strategies for Protecting Instream Flows*, 38 NAT. RESOURCES J. 157, 169-73 (1998); Jack Sterne, *Instream Rights and Invisible Hands: Prospects for Private Instream Flow Rights in the Northwest*, 27 ENVTL. L. 203 (1997); Gregory A. Thomas, *Conserving Aquatic Biodiversity: A Critical Comparison of Legal Tools for Augmenting Stream Flows in California*, 15 STAN. ENVTL. L.J. 3 (1996); Paul R. Williams & Stephen J. McHugh, *Water Marketing and Instream Flows: The Next Step in Protecting California's Instream Values*, 9 STAN. ENVTL. L.J. 132 (1990).

Some economists prefer to describe water as a "common good" rather than a public good.[44] Common goods, they tell us, differ from public goods because, while common goods are shared among a group of common owners, the common users can exhaust the goods, and not everyone on the planet has equal access to the goods. More formally, public goods are "non-rivalrous," while common goods are "rivalrous." The consumption of common goods by one person reduces the ability of others to consume the same good, exhibiting some measure of subtractability and excludability, qualities not found in true public goods.[45] With the category of common goods in place, few true public goods exist. Even a lighthouse, often presented as the paradigm of a true public good, is not used by everyone in the world, but only by those on ships coming within range of its light.[46] Perhaps only the blue sky qualifies as a true public good. From a legal point of view, the most central managerial problem regarding public goods is also the most central managerial problem for common goods: How can we recover the cost of maintaining or enhancing a good when a significantly large group of people have access and the legal right to use a good without a direct charge for this use? Both public goods and common goods are "common pool resources" that share this most basic dilemma.[47] This leads directly into the "tragedy of the commons."

Garrett Hardin explained the tragedy of the commons about 35 years ago: Allowing each common owner to decide for herself how to use a common pool resource can only function successfully when the supply consistently exceeds the demand for the resource.[48] Common

44. *See, e.g.*, COMMON PROPERTY RESOURCES: ECOLOGY AND COMMUNITY-BASED SUSTAINABLE DEVELOPMENT 7-8 (Fikret Berkes ed., 1989) [hereinafter COMMON PROPERTY RESOURCES]; ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION (1990).

45. *See* Steven C. Hackett et al., *The Role of Communication in Resolving Commons Dilemmas: Experimental Evidence with Heterogeneous Appropriators*, 27 J. ENVTL. ECON. & MGMT. 99 (1994).

46. *See* Ronald H. Coase, *The Lighthouse in Economics*, 17 J.L. & ECON. 357 (1974).

47. Michael Taylor, *The Economics and Politics of Property Rights and Common Pool Resources*, 32 NAT. RESOURCES J. 633 (1992); James W. Walker & Roy Gardner, *Probabilistic Destruction of Common-Pool Resources: Experimental Evidence*, 102 ECON. J. 1149, 1159-60 (1992).

48. *See* Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968); *see also* GLENN G. STEVENSON, COMMON PROPERTY ECONOMICS: A GENERAL THEORY AND LAND USE APPLICATIONS 7 (1991).

owners have the power to increase their individual use of the resource and to reap the full benefit of that increase.[49] The whole group, however, shares equally the cost imposed on the common resource.[50] Hardin used cows on a common pasture as his example. For each additional cow an individual owner adds to the herd, he obtains the full benefit of the added cow, while the common owners as a group share the burden of the reduced carrying capacity of the pasture.[51]

Hardin's critics have argued that, through informal limits imposed by small communities sharing a commons, commons have functioned successfully over extended periods in small communities even when use approached the carrying capacity of the resource.[52] These examples are irrelevant for describing how a "common" works in a large society where most persons are strangers to each other, where informal sanctions are not effective, and where formal law recognizes no real limits on any one person's exploitation of the common.[53] In such a setting, users receive the full incremental value of the changes they induce while bearing only a small fraction of the costs.[54] The only rational course for each common owner is to increase use until the users exhaust the resource.[55]

This is more than merely a theoretical model. People have destroyed common pool resources over and over again in the past century when a different rule did not displace the rule of common

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49. Hardin, *supra* note 48, at 1244.

50. *Id.*

51. *Id.*

52. *See, e.g.*, OSTROM, *supra* note 44; Taylor, *supra* note 47; ELINOR OSTROM ET AL., RULES, GAMES, AND COMMON-POOL RESOURCES 5 (1994) [hereinafter OSTROM, RULES, GAMES].

53. *See* OSTROM, RULES, GAMES, *supra* note 52, at 5; J.W. Harris, *Private and Non-Private Property: What Is the Difference?*, 111 L.Q. REV. 421 (1995).

54. OSTROM, RULES, GAMES, *supra* note 52, at 5.

55. *Id.*; Hardin, *supra* note 48, at 1248. *See generally* Carol M. Rose, *Given-Ness and Gift: Property and the Quest for Environmental Ethics*, 24 ENVTL. L. 1, 6-7 (1994) (examining property rights and environmental ethics). Some commentators have attempted to describe optimal conditions under which a commons might function successfully in more developed economic settings. *See generally* Richard Cornes et al., *The Commons and the Optimal Number of Firms*, 101 Q.J. ECON. 641 (1986) (comparing the socially optimum number of firms to a supply and demand elasticity); Hackett et al., *supra* note 45; Ethan Ligon & Urvashi Narain, *Government Management of Village Commons: Comparing Two Forest Policies*, 37 J. ENVTL. ECON. & MGMT. 272 (1999); Charles Mason & Owen Phillips, *Mitigating the Tragedy of the Commons Through Cooperation: An Experimental Evaluation*, 34 J. ENVTL. ECON. & MGMT. 148 (1997).

property.[56] The tragedy of the commons has occurred precisely as Hardin predicted regarding fish in the sea[57] and even, at times, national treasuries.[58] Faced with such realities, Hardin concluded that only a private property system, in which the system concentrated the costs and the benefits of resource-use decisions on a particular owner, could avoid the tragedy of the commons.[59]

Advocates of private property systems and markets for allocating and managing water are correct to the extent they demand an end to the classification of water as a free good. Water should not be a free good. The introduction of economic incentives, including fees, taxes, and "water banks" would require those who use water to evaluate more realistically the social consequences of their conduct.[60] Resort to economic incentives should not obscure the fact that water remains the prime example of a public good for which the marketplace cannot set a price without disregarding the property and other interests of numerous people affected by, but impossible to include, in the transaction. The reality of transaction costs should give even the most free-market oriented economist pause to consider whether true markets could function effectively for water resources.[61] True markets must remain marginal to the management of large quantities of water for numerous diverse users.

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56. Joseph W. Dellapenna, *Introduction to Riparian Rights*, *in* 1 WATERS AND WATER RIGHTS, 6-67 (Robert E. Beck ed., 2001 repl. vol.) [hereinafter Dellapenna, *Introduction*].

57. *See id.*; *see also, e.g.*, Manjira Datta & Leonard J. Mirman, *Externalities, Market Power, and Resource Extraction*, 37 J. ENVTL. ECON. & MGMT. 233, 233-34 (1999); Joseph W. Dellapenna, *Adapting Riparian Rights to the Twenty-First Century*, 106 W. VA. L. REV. 539, 563-65 (2004) [hereinafter Dellapenna, *Adapting Riparian Rights*]; Ronald D. Fischer & Leonard J. Mirman, *The Compleat Fish Wars: Biological and Dynamic Interactions*, 30 J. ENVTL. ECON. & MGMT. 34, 34-35 (1996); Patrick A. Nickler, *A Tragedy of the Commons in Coastal Fisheries: Contending Prescriptions for Conservation, and the Case of the Atlantic Bluefin Tuna*, 26 B.C. ENVTL. AFF. L. REV. 549, 550 (1999).

58. *See* Rodney D. Fort & John Baden, *The Federal Treasury as a Common Pool Resource and the Development of a Predatory Bureaucracy*, *in* BUREAUCRACY VS. ENVIRONMENT: THE ENVIRONMENTAL COSTS OF BUREAUCRATIC GOVERNANCE 9, 15-17 (John Baden & Richard L. Stroup eds., 1981).

59. Hardin, *supra* note 48; *see also* Bruce Yandle & Andrew P. Morriss, *The Technologies of Property Rights: Choice Among Alternative Solutions to Tragedies of the Commons*, 28 ECOLOGY L.Q. 123, 124-25 (2001).

60. *See, e.g.*, Michael Bothe, *The Evaluation of Enforcement Mechanism in International Environmental Law*, *in* ENFORCING ENVIRONMENTAL STANDARDS: ECONOMIC MECHANISMS AS VIABLE MEANS? 13, 20-21 (Rüdiger Wolfrum ed., 1996).

61. *See* Howe et al., *supra* note 38, at 396-98.

II. TYPES OF PROPERTY REGIMES

For a market to function at all, the government must establish a well-defined set of property rights for the commodity in question. Thus, in order to consider introducing markets as a water management tool, one must evaluate the several types of water law regimes for the type of property rights they establish. Property rights provide individuals or collectives with the power to determine how they use a resource. Property rights depend not on the qualities of the goods themselves, but on the social relations created or confirmed by the law regarding rights to use the good.[62] There are three types of property rights known to the law: (1) A good subject to individual decisions by everyone with legal access to the good is *common property*; (2) A good subject to individual decisions by persons with sole legal access to the goods is *private property*; and (3) A good subject to collective decisions by all interested persons acting through a joint management mechanism is *public property*.[63]

The differing mix of climates and demand in varying parts of the United States led to three different approaches to property rights relating to water.[64] Each of these forms of property rights corresponds to one of the primary models of property rights discussed above.[65] Traditionally, the humid eastern states established a system of riparian rights that corresponds to a common property model.[66] The drier western states established a system of appropriative rights

62. *See* Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 347 (1967).

63. Dellapenna, *Getting Names Right*, *supra* note 25, at 336-42; *see also* STEPHEN R. MUNZER, A THEORY OF PROPERTY 25-27 (1990); Demsetz, *supra* note 62, at 354. *See generally* CAROL M. ROSE, PROPERTY AND PERSUASION: ESSAYS ON THE HISTORY, THEORY, AND RHETORIC OF OWNERSHIP (1994); Robert J. Goldstein, *Green Wood in the Bundle of Sticks: Fitting Environmental Ethics and Ecology into Real Property Law*, 25 B.C. ENVTL. AFF. L. REV. 347 (1998); Harris, *supra* note 53.

64. Dellapenna, *Getting Names Right*, *supra* note 25, at 337-38; Bernhard Grossfeld, *Geography and Law*, 82 MICH. L. REV. 1510, 1514-15 (1984). *See generally* Joseph W. Dellapenna, *Dual Systems*, *in* 1 WATERS AND WATER RIGHTS 8-1 to 8-40 (Robert E. Beck ed., 2001 repl. vol.) [hereinafter Dellapenna, *Dual Systems*].

65. Dellapenna, *Getting Names Right*, *supra* note 25, at 337-38; Demsetz, *supra* note 62, at 357.

66. *See* Joseph W. Dellapenna, *The Right to Consume Water Under "Pure" Riparian Rights*, *in* 1 WATERS AND WATER RIGHTS 7-1 to 7-128 (Robert E. Beck ed., 2001 repl. vol.) [hereinafter Dellapenna, *Right to Consume Water*].

that corresponds to a private property model.[67] More recently, the eastern states have established a system of regulated riparianism that corresponds to a public property model.[68]

The correspondence between forms of American water law and types of property enables one to predict with some certainty whether a form can adapt to changing circumstances or whether an entirely new form becomes necessary when water demand or supply changes dramatically.[69] It seems increasingly clear that riparian rights—a common property system—cannot survive.[70] A careful examination of our experience with markets for water, however, shows that a private property system for water, such as appropriative rights, also cannot solve the problems of a humid, eastern state. At this time, regulated riparianism is the best model for water allocation in the future, at least in an eastern state operating within the tradition of riparianism.

A. Riparian Rights

Riparian rights derive from the natural availability of water to the land.[71] Land abutting or underlying a watercourse is "riparian land."[72] Today, courts almost invariably apply the reasonable use version of riparian rights.[73] The reasonable use rule is a common property system under which all who own land contiguous to a surface water body are co-owners of the right to use the water from a contiguous

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67. *See* Robert E. Beck et al., *Introduction and Background*, *in* 2 WATERS AND WATER RIGHTS 11-1 to 11-14, 11-19 to 11-25, 11-48 to 11-52 (Robert E. Beck ed., 2001 repl. vol.) (examining the history and development of appropriative water rights) [hereinafter Beck et al., *Introduction and Background*].

68. *See* Joseph W. Dellapenna, *Regulated Riparianism*, *in* 1 WATERS AND WATER RIGHTS, 9-2 to 9-8, 9-34 to 9-120 (Robert E. Back, ed., 2001 repl. vol.) [hereinafter Dellapenna, *Regulated Riparianism*].

69. *See generally* Robert H. Abrams, *Charting the Course of Riparianism: An Instrumentalist Theory of Change*, 35 WAYNE L. REV. 1381 (1989); Dellapenna, *Adapting Riparian Rights*, *supra* note 57.

70. Dellapenna, *Getting Names Right*, *supra* note 25, at 342-45.

71. *See* Tyler v. Wilkinson, 24 F. Cas. 472, 474 (C.C.D.R.I. 1827) ("The natural stream, existing by the bounty of Providence for the benefit of the land through which it flows, is an incident annexed, by operation of law, to the land itself."); *see also* JOHN GOULD, THE LAW OF WATERS § 148 (3rd ed. 1900).

72. The word "riparian" itself derives from the Latin word "ripa," meaning a riverbank. Johnson v. McCowen, 348 So. 2d 357, 360 n.3 (Fla. Dist. Ct. App. 1977). For an analysis of what constitutes riparian land, see Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-16 to 7-27.

73. *See* Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-41 to 7-57.

watercourse.[74] The common owners may exercise this right regardless of the effect the use has on the natural flow of the watercourse so long as each user does not transgress the equal right of other riparians to use the water.[75] While domestic uses are preferred over other uses, the only real restriction is that no use is legal if it "unreasonably harms" another riparian use.[76]

As co-owners, riparian owners use their own individual judgment in deciding whether, when, and how to use the resource.[77] A court will intervene in these decisions only when a use by one co-owner interferes directly with a use by another co-owner.[78] The reasonable use theory assures that each riparian has an equal claim to share in the water.[79] Under this theory, a court will allocate disputed water rights in a way that maximizes the social benefit of the use of the water while minimizing harm to others.[80] The only firm rule regarding reasonableness is that, because the right to use water arises from the riparian nature of the land, any use on non-riparian land is per se unreasonable.[81]

When *pro rata* sharing among competing users is possible, courts, under the reasonable use rule, have preferred it as the fairest resolution when there is a limited amount of water.[82] Sometimes courts must effectively cut off one user altogether so that another riparian owner's use might continue.[83] In these cases, courts give only minimal, if any, attention to non-economic issues such as the natural characteristics of the stream, general social concerns, or

74. *See id.* at 7-41 to 7-42.
75. *Id.* at 7-41 to 7-52.
76. *Id.* at 7-27 to 7-30, 7-41 to 7-57.
77. *Id.* at 7-41 to 7-57.
78. *See id.* at 7-41 to 7-47.
79. *See* RESTATEMENT (SECOND) OF TORTS § 850 cmt. d (1977).
80. *Id.* § 850A cmt. e.
81. Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-46.
82. *See* Jones v. Oz-Ark-Val Poultry Co., 306 S.W.2d 111, 115 (Ark. 1957); White v. East Lake Land Co., 23 S.E. 393, 394 (Ga. 1895); Bouris v. Largent, 236 N.E.2d 15, 17 (Ill. App. Ct. 1968); Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-76 to 7-79.
83. *See, e.g.*, Harris v. Brooks, 283 S.W.2d 129 (Ark. 1955).

abstract justice.[84] The key appears to be the economic value of the competing activities. Because the courts base their determination on the economic value of the competing activities, a court will have to reopen the suit whenever product values change significantly. If the market values change, a court would have to reevaluate the reasonableness of the competing uses.

Riparian rights systems have serious problems, including the vagueness and unpredictability of the criteria for decisions, the lack of a process for managing water during extreme shortages, the lack of process to protect public values, the systematic bias in favor of large users, and the impracticality of markets under a legal regime suffering from these shortcomings.[85] Given the vague and unpredictable criteria for decisions, even long established uses can be cut off without compensation if a court decides that a recently begun use is more reasonable.[86] Just as problematic, courts can only give a decision that is good for the specific day on which the court gives it.[87] If a competing use changes in physical or economic terms, what was previously a reasonable use may suddenly become unreasonable. Some have used this instability of result to explain the shift to appropriative rights in western states and the shift to regulated riparianism in eastern states.[88] If water shortages become chronic, this instability could become a serious impediment to private investment in water use facilities.[89]

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84. These principles figure prominently in the original *Restatement of Torts* even if they do not figure prominently in the cases. RESTATEMENT (SECOND) OF TORTS § 850A; *see* Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-54.

85. Dellapenna, *Introduction*, *supra* note 56, at 6-61 to 6-77; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-87 to 9-95.

86. Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-57 to 7-90.

87. *See* Richard C. Ausness, *Water Rights, the Public Trust Doctrine, and the Protection of Instream Uses*, 1986 U. ILL. L. REV. 407, 416-18; Dellapenna, *Water Allocation*, *supra* note 5, at 16; Fortuna, *supra* note 2, at 1023.

88. *See* Coffin v. Left Hand Ditch Co., 6 Colo. 443, 447 (1882); Drake v. Earhart, 23 P. 541, 542-43 (Idaho 1890); Jones v. Adams, 6 P. 442, 445 (Nev. 1885); *see also* FRANK E. MALONEY, RICHARD C. AUSNESS, & J. SCOTT MORRIS, A MODEL WATER CODE 189-191 (1972); Dellapenna, *Dual Systems*, *supra* note 64, at 8-5 to 8-6, 8-14 to 8-17; Dellapenna, *Regulated Riparianism*, *supra* note 66, at 9-3 to 9-6; Mason Gaffney, *Economic Aspects of Water Resources Policy*, 28 AM. J. ECON. & SOC. 131, 137-38 (1969).

89. *See, e.g.*, Carol M. Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 54 U. CHI. L. REV. 711, 716, 768 (1986).

The slow, laborious process of litigation between individuals is a poor tool for managing water in times of shortage or for otherwise protecting public values.[90] Courts normally consider only the interests of the parties to the actual litigation and are ill-equipped to consider interests of riparians not involved in the suit, let alone the interests of the public generally.[91]

The resulting lack of efficient, system-wide management creates a systematic bias in favor of large users.[92] Small users will be less able to afford to litigate, or to organize collectively for litigation, if water they need is taken by another, more affluent riparian. Even if they succeed in organizing for litigation, the balancing process generally strongly favors large users over smaller users because the economic value of the water to the large user usually outweighs the economic loss of the small users. While small users can effectively aggregate their claims through receipt of their water through a public system, the effectiveness of this approach is limited by legal doctrines limiting the riparianness of public systems.[93] Aggregation either by joint litigation or through receipt of water through a public system, moreover, requires submission to yet a different sort of large-scale enterprise.[94]

Finally, persons seeking to acquire the right to use water might want to "buy" riparian rights without buying riparian land, in an attempt to create a "non-appurtenant" riparian right.[95] The effect of such an attempted sale is unclear.[96] Some courts have concluded that the buyer obtains no rights whatsoever against riparians other than

90. *See* Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-128 to 7-133; *see also* Fortuna, *supra* note 2, at 1023.

91. *See* George D. Marlow, *From Black Robes to White Lab Coats: The Ethical Implications of a Judge's* Sua Sponte, Ex Parte *Acquisition of Social and Other Scientific Evidence during the Decision-Making Process*, 72 ST. JOHN'S L. REV. 291 (1998); *see also* Dellapenna, *Right Consume Water*, *supra* note 66, at 7-131 to 7-132; Fortuna, *supra* note 2, at 1023-24.

92. Dellapenna, *Regulated Riparianism*, *supra* note 68, at 7-129 to 7-133; Fortuna, *supra* note 2, at 1024.

93. *See* Pernell v. City of Henderson, 16 S.E.2d 449, 451 (N.C. 1941); Town of Purcellville v. Potts, 19 S.E.2d 700, 703 (Va. 1942); *see also* Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-149 to 7-154.

94. Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-131 to 7-132.

95. *See id.* at 7-97 to 7-98.

96. *See id.* at 7-97 to 7-107.

the seller.[97] The attempted sale amounts only to a contract by the seller not personally to contest the buyer's right to use water from the common source.[98] Several courts, including one in Georgia, have recently held that a buyer of a non-appurtenant riparian right acquires a right to make a reasonable use along with the remaining riparian landowners.[99] But whether courts will measure this right of use by the reasonable needs of the seller (therefore avoiding possible prejudice to other riparians) or of the buyer (thus treating the buyer as a full, equal riparian) remains unclear.[100] Given the uncertainties, it is no wonder that non-appurtenant sales remain rare.

The problems with riparian rights flow from the fact that riparian rights are a form of common property.[101] The ultimate outcome of this common property system is clear—riparian rights cannot survive. Our experience with riparian rights illustrates another feature of common property regimes. If exploitation of common property requires significant capital investment, the inability of potential investors to keep others from preempting an investor's uses will cause under-investment in the resource.[102] This fear caused the drier western states to reject riparian rights in favor of an attempt to create a private property system.[103] Yet, the resulting system of appropriative rights, in practice, has proven to be just as problematic as riparian rights.

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97. *See, e.g.*, Hendrix v. Roberts Marble Co., 165 S.E. 223 (Ga. 1932); Phillips v. Altman, 412 P.2d 199 (Okla. 1966); Tipperman v. Tsiatsos, 915 P.2d 446 (1997).

98. *See* Borough of Media v. Edgmont Golf Club, Inc., 288 A.2d 803, 804 (Pa. 1972). *See generally* Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-97 to 7-98.

99. *See* Pyle v. Gilbert, 265 S.E.2d 584, 589 (Ga. 1980); *see also* Mianus Realty Co. v. Greenway, 193 A.2d 713 (Conn. 1963); Belvedere Dev. Corp. v. Dep't of Transp., 476 So. 2d 649 (Fla. 1985); Mid-America Terminal of Ky., Inc. v. Owensboro River Sand & Gravel Co., 532 S.W.2d 437 (Ky. 1976); Sundell v. Town of New London, 409 A.2d 1315 (N.H. 1979); Donaghey v. Croteau, 401 A.2d 1081 (N.H. 1979); Thomas v. Clark, 346 A.2d 189 (Vt. 1975).

100. *See* Dellapenna, *Right to Consume Water*, *supra* note 66, at 7-106.

101. *See* the text *supra* at note 63.

102. *See In re* Waters of Long Valley Creek, 599 P.2d 656, 666-67 (Cal. 1979); Jerome W. Milliman, *Water Law and Private Decision-Making: A Critique*, 2 J.L. & ECON. 41, 47 (1959); Rose, *supra* note 89.

103. *See, e.g.*, Coffin v. Left-Hand Ditch Co., 6 Colo. 443, 446-47 (1882). *See generally* Dellapenna, *Dual Systems*, *supra* note 64, at 8-1 to 8-40; Hardin, *supra* note 48; Beck et al., *Introduction and Background*, *supra* note 67, at 11-2.

B. Appropriative Rights

"Anglo" settlers in the West quickly concluded that a riparian rights system could not satisfy their needs for water in either its natural flow version or in its reasonable use version.[104] Yet the "Anglo" settlers also generally swept away aboriginal and Spanish-Mexican law.[105] Instead, the newcomers developed a new approach to water allocation—appropriative rights.[106] Appropriative rights did not arise, however, from careful analysis of the legal needs of western states. The legal regime of appropriative rights arose simply because the early miners in California and elsewhere in the West trespassed in a land without an organized government in place.[107]

The newly acquired lands were deemed to belong to the federal government (the "public domain"), while, under riparian rights, the right to use water was held by the owner of the land. Because the "forty-niners" were unwilling to await for the establishment of a regular government and the completion of the comprehensive land surveys that were necessary before the government would sell the land, the miners simply trespassed on the land and took what water they needed.[108]

The miners brought order to their lives through vigilante law, creating a national mythology involving violent disputes, blood

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104. *See generally* Dellapenna, *Dual Systems*, *supra* note 64, at 8-1 to 8-40; Grossfeld, *supra* note 64.

105. *See* Dellapenna, *Dual Systems*, *supra* note 64, at 8-2 to 8-5. The few apparent survivals of Spanish-Mexican law actually were fictions invented by the imagination of common law judges. *See, e.g.*, City of Los Angeles v. City of San Fernando, 537 P.2d 1250, 1265-67, 1275-77 (Cal. 1975); *In re* Contests of the City of Laredo, 675 S.W.2d 257, 268-70 (Tex. App. 1984); *see also* Dellapenna, *Dual Systems*, *supra* note 64, at 8-1 to 8-40. *See generally* BETTY EAKLE DOBKINS, THE SPANISH ELEMENT IN TEXAS WATER LAW 136-39 (1959); DONALD J. PISANI, TO RECLAIM A DIVIDED WEST: WATER, LAW, AND PUBLIC POLICY, 1848-1902, at 38-46 (1992); DANIEL TYLER, THE MYTHICAL PUEBLO RIGHTS DOCTRINE: WATER ADMINISTRATION IN HISPANIC NEW MEXICO (1990); Peter L. Reich, *Mission Revival Jurisprudence: State Courts and Hispanic Water Law Since 1850*, 69 WASH. L. REV. 869, 882-914 (1994) [hereinafter Reich, *Mission Revival Jurisprudence*]; Peter L. Reich, *The "Hispanic" Roots of Prior Appropriation in Arizona*, 27 ARIZ. ST. L.J. 649 (1995) [hereinafter Reich, *Hispanic Roots*]. While early statutes in several states, including California, preserved the Spanish-Mexican irrigation law, these rights were always subordinated to the needs of miners. DOBKINS, *supra* note 105, at 136-39; PISANI, *supra* note 105, at 38-44; Dellapenna, *Dual Systems*, *supra* note 64, at 8-2 to 8-3.

106. *See* Dellapenna, *Dual Systems*, *supra* note 64, at 8-8 to 8-40.

107. *See id.* at 8-10 to 8-13; Dellapenna, *Water Allocation*, *supra note* 5, at 20.

108. *See* Dellapenna, *Dual Systems*, *supra* note 64, at 8-10 to 8-11; Dellapenna, *Water Allocation*, *supra* note 5, at 20-21; *see also* NORRIS HUNDLEY, JR., THE GREAT THIRST: CALIFORNIANS AND WATER, 1770S-1990S, at 67-73 (1992).

feuds, and sudden death.[109] Vigilante law was based upon the most elementary notion of justice—first in time, first in right.[110] If someone occupied another person's mining claim, the vigilantes would hang the new occupant if he could not justify his occupation. When governments were finally organized after 1850, they could only ratify the customs of the miners.[111] The miners applied precisely the same principles to water as they did to land.[112]

After 150 years, the miners' rule has been developed into a complex and sophisticated system of water administration found, in one form or another, in every appropriation state.[113] In some states, where farmers settled part of a state before or simultaneously with miners, the courts applied riparian rights.[114] Eventually, across the West appropriative rights displaced riparian rights.[115] In the Plains States and on the Pacific Coast, riparian rights vestigially remain, but usually with little impact on how the states manage water.[116]

Appropriative rights are basically a private property approach to water allocation in which water rights are defined as to quantity, time, place, manner of use, and most importantly according to their priority relative to other uses.[117] Appropriative rights are more uncertain than the "first in time, first in right" principle suggests. The earliest use of the first in time, first in right principle predates the modern administrative machinery in almost every appropriative

109. *See* Dellapenna, *Dual Systems*, *supra* note 64, at 8-11.

110. *Id.* at 8-11. Historian Donald Pisani has documented the support small miners gave to riparian rights because of the increasing concentration of water in the hands of large, capital-intensive mining companies. PISANI, *supra* note 105, at 23-26, 35-38.

111. *See* Jennison v. Kirk, 98 U.S. 453, 457 (1878) ("[T]he miners . . . were emphatically the law-makers, as respects mining, upon the public lands in the State."); *see also* HUNDLEY, *supra* note 108, at 71-72.

112. Irwin v. Phillips, 5 Cal. 140, 141 (1855).

113. C. Peter Goplerud III, *The Permit Process and Colorado's Exception*, *in* 2 WATERS AND WATER RIGHTS 15-1 to 15-52 (Robert E. Beck ed., 2001 repl. vol.).

114. Irwin v. Phillips, 5 Cal. 140 (1855); *see* Dellapenna, *Dual Systems*, *supra* note 64, at 8-12 to 8-13.

115. *See* Dellapenna, *Dual Systems*, *supra* note 64, at 8-8 to 8-40.

116. *See id.* at 8-40 to 8-72.

117. *See, e.g.*, Orr v. Arapahoe Water & Sanitation Dist., 753 P.2d 1217 (Colo. 1988); Rominiecki v. McIntyre Livestock Corp., 633 P.2d 1064 (Colo. 1981); State *ex rel.* Cary v. Cochran, 292 N.W. 239, 243 (Neb. 1940); Rencken v. Young, 711 P.2d 954 (Or. 1985); Basin Elec. Power Coop. v. State Bd. of Control, 578 P.2d 557 (Wyo. 1978).

rights state.[118] Despite statutes and legal proceedings to facilitate putting these claims on record, on at least some watercourses, the earliest—and hence the most valuable rights to use water—have never been precisely quantified.[119] Prescriptive, abandoned, or forfeited rights also create gaps in the official record.[120]

In significant respects, the appropriative rights doctrine did not, and does not, serve its communities well.[121] For example, the doctrine actually encourages waste under particular circumstances.[122] The first in time, first in right principle fosters premature development because water users seek to capture unappropriated waters to gain control over potential future uses of those waters.[123] Using water is a cost to society, but a private gain to an appropriator. To use water, one must invest real capital to divert, store, and apply water. Investors switch capital from socially productive uses to the

118. In 1890, Wyoming enacted the first statute creating a formal administrative system; most recently, Alaska enacted a similar statute in 1966. *See generally* Dellapenna, *Dual Systems*, *supra* note 64, at 8-25 to 8-40 (describing the Oregon doctrine); Goplerud, *supra* note 113. Anglo settlement, with claims of appropriative rights, began in the 1840s in California and at later dates in other states—always well before the creation of the administrative machinery.

119. *See* NAT'L RESEARCH COUNCIL, WATER TRANSFERS IN THE WEST: EFFICIENCY, EQUITY, AND THE ENVIRONMENT 76 (1992); *see also, e.g.*, C. Peter Goplerud III, *Adjudication of Water Rights*, *in* 2 WATERS AND WATER RIGHTS 16-1 to 16-7 (Robert E. Beck ed., 2001 repl. vol.).

120. *Recognizing prescriptive rights:* Gibbons v. Globe Dev., 553 P.2d 1198, 1199 (Ariz. 1976); Sears v. Berryman, 623 P.2d 455, 458-59 (Idaho 1981). *Refusing to recognize prescriptive rights:* People v. Shirokow, 605 P.2d 859, 864-65 (Cal. 1980). *Abandonment:* City and County of Denver Bd. of Water Comm'rs v. Snake River Water Dist., 788 P.2d 772, 776 (Colo. 1990); Jenkins v. State Dep't of Water Res., 647 P.2d 1256, 1260-61 (Idaho 1982); Crandall v. Water Res. Dep't, 626 P.2d 877, 880 (Or. 1981); Okanogan Wilderness League, Inc. v. Town of Twisp, 947 P.2d 732, 739 (Wash. 1997). *Forfeiture: Jenkins*, *supra*; Town of Eureka v. State Eng'r of Nev., 826 P.2d 948, 952 (Nev. 1992); *In re* Cancellation of the Stabio Ditch Water Rights, 417 N.W.2d 391, 394 (S.D. 1987); Sheep Mountain Cattle Co. v. Dep't of Ecology, 726 P.2d 55, 57 (Wash. Ct. App. 1986); State Bd. of Control v. Johnson Ranches, Inc., 605 P.2d 367, 368 (Wyo. 1980). *See generally* C. Peter Goplerud III, *Administration, Protection and Termination of the Water Right*, *in* 2 WATERS AND WATER RIGHTS 17-9 to 17-18 (Robert E. Beck ed., 2001 repl. vol.); John D. Leshy, *The Prior Appropriation Doctrine of Water Law in the West: An Emperor with Few Clothes*, 29 J.WEST 5, 7-8 (1990).

121. *See* Dellapenna, *Water Allocation*, *supra* note 5, at 22; Gaffney, *supra* note 88, at 139; Leshy, *supra* note 120, at 11; Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919, 922 (1998).

122. *See* Dellapenna, *Water Allocation*, *supra* note 5, at 22-23.

123. *See* Amy Beatie & James Fosnaught, *The City of Golden's Application for Surface Water Rights: A Kayak Course, In-stream Flow, Dilution, or What?*, 2 U. DENV. WATER L. REV. 273, 282 (1999); Dellapenna, *Water Allocation*, *supra* note 5, at 23; Gaffney, *supra* note 88, at 140; Steven J. Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 OR. L. REV. 483, 486 (1982). *See generally* Charles W. Howe et al., *The Performance of Appropriative Water Rights Systems in the Western United States During Drought*, 22 NAT. RESOURCES J. 379 (1982).

capturing of sub-marginal resources, making excessive diversion capacity the norm under appropriative rights.[124] For most appropriations of water, however, users make inadequate investment in the post-diversionary aspects of development, especially those designed to save water.[125] As Gaffney states:

> Much of the water "shortage" of the arid west would disappear overnight if appropriators had to start paying an economic price for water; and it would be greatly abated if they simply started thinking in terms of a zero price, instead of, as now, regarding the price to be negative because of the gain they realize by piling up a great "history" of "use."[126]

These shortcomings have become more significant because less and less water remains unappropriated and because of growing recognition of the importance of non-consumptive uses of water.[127]

All water rights derive from a common supply, but each water right is defined in a way that changes the aggregate variability of supply beyond the natural variability and that distributes these risks unequally. Under the "first in time, first in right" rule, there is no pooling of risk.[128] When water runs short, a junior appropriator must drop out first and lose everything before the next senior appropriator loses anything.[129] Instead of pooling risks, senior appropriators are protected by exaggerating the risk to junior appropriators.[130] In addition, the rule denies another basic economizing principle: marginal productivity.[131] A junior appropriator loses some marginal

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124. Dellapenna, *Water Allocation*, *supra* note 5, at 23; Gaffney, *supra* note 88, at 140.

125. Dellapenna, *Water Allocation*, *supra* note 5, at 23; Gaffney, *supra* note 88, at 140.

126. Gaffney, *supra* note 88, at 140.

127. *See* Dellapenna, *Water Allocation*, *supra* note 5, at 28; Neuman, *supra* note 121; Shupe, *supra* note 123.

128. *See* Gaffney, *supra* note 88, at 140.

129. For extreme examples, see State *ex rel.* Cary v. Cochran, 292 N.W. 239, 246 (Neb. 1940); *see also* Dellapenna, *Water Allocation*, *supra* note 5, at 24; Gaffney, *supra* note 88, at 140; Goplerud, *supra* note 120, at 17-1 to 17-8.

130. Dellapenna, *Water Allocation*, *supra* note 5, at 24-25; Gaffney, *supra* note 88, at 140.

131. *See generally* ROBIN PAUL MALLOY, LAW AND ECONOMICS: A COMPARATIVE APPROACH TO THEORY AND PRACTICE 20-33 (1990); Dellapenna, *Water Allocation*, *supra* note 5, at 24-25; Fortuna, *supra* note 2, at 1022; Gaffney, *supra* note 88, at 140.

units of high productivity while a senior appropriator retains marginal units of low productivity.

The first in time, first in right rule also puts a premium on jumping the gun. The farther one is from a source and the more convenient it is to others, the greater the motive to get there first to preclude them. Typically, the first claimants on a source are scattered. Soon users fully claim the supply, and even nearby dry lands can never get water from this source.[132] The owners of those lands, however, can search for other, more remote sources. The results are apparent throughout the western states: ditches crisscross the states carrying water in opposite directions as appropriators exercise their rights. Recent laws designed to protect areas of origin have had limited impact.[133]

Traditionally, states using appropriative rights made no efforts to protect the public interest in the waters of the state.[134] Many appropriative rights states have enacted statutes requiring consideration of the public interest in evaluating applications for new appropriations.[135] These statutes do not apply to existing water rights and thus have no practical effect in water basins in which most or all available water has already been appropriated.[136] Today, many argue that society should offer more protection to endangered species and provide water for public values other than irrigation.[137] Appropriative rights remain a problem for achieving these goals.

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132. *See, e.g.*, State *ex rel.* Cary v. Cochran, 292 N.W. 239, 245 (Neb. 1940).

133. *See* NAT'L RESEARCH COUNCIL, *supra* note 119, at 77-79; Robert H. Abrams, *Interbasin Transfer in a Riparian Jurisdiction*, 24 WM. & MARY L. REV. 591 (1993); Gregory S. Weber, *Twenty Years of Local Groundwater Export Legislation in California: Lessons from a Patchwork Quilt*, 34 NAT. RESOURCES J. 657 (1994).

134. *See* Dellapenna, *Water Allocation*, *supra* note 5, at 28; Gaffney, *supra* note 88, at 138.

135. Collins Bros. Corp. v. Dunn, 759 P.2d 891, 897-98 (Idaho 1988). *See generally* Goplerud, *supra* note 113, at 15-23 to 15-25.

136. Alexandra E. Viscusi, *Conflicting Directives: Water Quality and Appropriative Water Rights in the West*, 20 WM. & MARY ENVTL. L. & POL'Y REV. 121, 142 (1995).

137. *See, e.g.*, Reed D. Benson, *A Watershed Issue: The Role of Streamflow Protection in Northwest River Basin Management*, 26 ENVTL. L. 175, 176-77 (1996); Lawrence J. MacDonnell, *Managing Reclamation Facilities for Ecosystem Benefits*, 67 U. COLO. L. REV. 197, 200 (1996); Michael R. Moore et al., *Water Allocation in the American West: Endangered Fish Versus Irrigated Agriculture*, 36 NAT. RESOURCES J. 319, 319-20 (1996); Carmen Sower-Hall & Holly I. Holder, *Water Quality Issues in Augmentation Plans and Exchanges*, 1 U. DENV. WATER L. REV. 96, 98-99 (1997) (focusing on water quality); Viscusi, *supra* note 136, at 121, 142; Wendy Weiss, *The Federal Government's Pursuit of Instream Flow Water Rights*, 1 U. DENV. WATER L. REV. 151, 160-61 (1998).

Finally, appropriative rights are a rather peculiar form of private property. As a private property system, one would expect appropriative rights to give rise to markets for water rights, yet there has never been a market for appropriative rights to any significant extent despite critical needs for water transfers in every area.[138] Rather than assuring efficient use of the resource, the appropriative rights system effectively freezes uses in place—unless the state intervenes directly and dramatically to transfer the water to other uses.[139] Even the highly touted California Water Bank turns out to have been administrative reallocation masquerading as a market.[140]

Recognition and protection of third-party rights simply precludes true market transactions.[141] A leading example of the third-party rule

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138. *See* RODNEY T. SMITH, TRADING WATER: AN ECONOMIC AND LEGAL FRAMEWORK FOR WATER MARKETING 1-10 (1988); RICHARD W. WAHL, MARKETS FOR FEDERAL WATER: SUBSIDIES, PROPERTY RIGHTS, AND THE BUREAU OF RECLAMATION 147-91 (1989); Janis M. Carey & David L. Sunding, *Emerging Markets in Water: A Comparative Institutional Analysis of the Central Valley and Colorado-Big Thompson Projects*, 41 NAT. RESOURCES J. 283, 284 (2001); Dellapenna, *Adapting Riparian Rights*, *supra* note 57, at 573-75; Dellapenna, *Getting Names Right*, *supra* note 25, at 324, 356-57; George A. Gould, *A Westerner Looks at Eastern Water Law: Reconsideration of Prior Appropriation in the East*, 25 U. ARK. LITTLE ROCK L. REV. 89, 100 (2002); Zachary McCormick, *Institutional Barriers to Water Marketing in the West*, 30 WATER RESOURCES BULL. 953, 954 (1994); Barton H. Thompson, Jr., *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671, 723-30 (1993); Robert A. Young, *Why Are There So Few Transactions Among Water Users?*, 68 AM. J. AGRIC. ECON. 1143, 1143 (1986).

139. *See* ANDERSON & SNYDER, *supra* note 26; NAT'L RESEARCH COUNCIL, *supra* note 119; SMITH, *supra* note 138; WAHL, *supra* note 138, at 140-44; RICHARD W. WAHL, WATER MARKETING IN CALIFORNIA: PAST EXPERIENCE, FUTURE PROSPECTS 11-12 (1993); James D. Crammond, *Leasing Water Rights for Instream Flow Uses: A Survey of Water Transfer Policy, Practices, and Problems in the Pacific Northwest*, 26 ENVTL. L. 225 (1996); Dellapenna, *Getting Names Right*, *supra* note 25, at 356-57; Thomas J. Graff & David Yardas, *Reforming Western Water Policy: Markets and Regulation*, 12 NAT. RESOURCES & ENV'T 165 (1998); Brian E. Gray, *The Modern Era in California Water Law*, 45 HASTINGS L.J. 249 (1994); Ronald C. Griffin & Fred O. Boadu, *Water Marketing in Texas: Opportunities for Reform*, 32 NAT. RESOURCES J. 265 (1992); Morris Israel & Jay R. Lund, *Recent California Water Transfers: Implications for Water Management*, 35 NAT. RESOURCES J. 1 (1995); Kaiser & Binion, *supra* note 43; Ronald A. Kaiser & Laura M. Phillips, *Dividing the Waters: Water Marketing as a Conflict Resolution Strategy in the Edwards Aquifer Region*, 38 NAT. RESOURCES J. 411, 436-43 (1998); Sterne, *supra* note 43; Thompson, *supra* note 138; Young, *supra* note 138.

140. *See* Dellapenna, *Introduction*, *supra* note 56, at 6-78 to 6-85; Dellapenna, *Getting Names Right*, *supra* note 25, at 358-65.

141. *See generally* DAVID L. MITCHELL, WATER MARKETING IN CALIFORNIA: RESOLVING THIRD-PARTY IMPACT ISSUES (1993); NAT'L RESEARCH COUNCIL, *supra* note 119, at 5-6, 38-42, 73-78, 189-91, 225-28, 254-57, 263-65; SMITH, *supra* note 138, at 17-26; Bonnie G. Colby, *Transaction Costs and Efficiency in Western Water Allocation*, 72 AM. J. AGRIC. ECON. 1184 (1990); Dellapenna, *Getting Names Right*, *supra* note 25, at 350-56; Casey S. Funk & Amy M. Cavanaugh, *Basic Exchange 101*, 1 U. DENV. WATER L. REV. 177 (1998); Harbison, *supra* note 25, at 546-49; Howe et al., *supra* note 38; Jay R. Lund, *Transaction Risk Versus Transaction Cost in Water Transfers*, 29 WATER RESOURCES

is the case of *City and County of Denver v. Fulton Irrigating Ditch Co.*[142] The case arose from a proposed swap between the City of Denver and a brewery: Denver would take Coors' "clear mountain stream" to augment its municipal supplies, and Coors would have the right to use unlimited quantities of Denver sewage water for its brewery.[143] The transaction failed not because of possible outrage by beer drinkers but because farmers downstream from Denver, organized as the Fulton Irrigating Ditch Company, obtained an injunction against this trade because it would deprive them of the water on which they relied.[144] The farmers recognized the seniority of Denver's water rights over their own rights in a contract settling an earlier dispute.[145] The decision in the case would not have depended on the contract if the water had not been imported from another basin.[146]

Advocates of giving free play to markets for raw water insist that their opponents' obsession with the protection of third-party rights results in overly rigid laws.[147] They argue that, if the government would remove these restraints, private property regimes and markets would flourish. This is not correct. Area-of-origin statutes, prohibiting the export of water, interfere with private property rights and prevent market transactions.[148] Protections for third-party rights

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RES. 3103 (1993); Kevin M. O'Brien & Robert R. Gunning, *Water Marketing in California Revisited: The Legacy of the 1987-92 Drought*, 25 PAC. L.J. 1053, 1062-74 (1994); Young, *supra* note 138. For examples of the rule in operation, see: Santa Fe Trail Ranches Property Owners Ass'n v. Simpson, 990 P.2d 46 (Colo. 1999); *In re* May, 756 P.2d 362 (Colo. 1988); Orr v. Arapahoe Water & Sanitation Dist., 753 P.2d 1217 (Colo. 1988); *In re* Sleeper, 760 P.2d 787 (N.M. App. 1988).

142. 506 P.2d 144 (Colo. 1972).

143. *Id* at 151.

144. *Id.* at 153.

145. *Id.* at 151.

146. *Id.* at 146.

147. *See* ANDERSON & SNYDER, *supra* note 26, at 20; NAT'L RESEARCH COUNCIL, *supra* note 119, at 70-72; Andrew P. Morriss, *Lessons from the Development of Western Water Law for Emerging Water Markets: Common Law vs. Central Planning*, 80 OR. L. REV. 861, 930-31 (2001); Andrew P. Tauriainen, *California's Evolving Water Law: The Water Rights Protection and Expedited Short-Term Water Transfer Act of 1999*, 31 MCGEORGE L. REV. 411, 422 (2000); Young, *supra* note 138, at 1145, 1150. *But see* SMITH, *supra* note 138, at 14 (characterizing protection of third-party rights as a broad and flexible mandate).

148. *See, e.g.*, CAL. WATER CODE § 10505.5 (West 1992). *See generally* Owen L. Anderson, *Reallocations, Transfers and Changes*, *in* 2 WATERS AND WATER RIGHTS 14-63 to 14-76 (Robert E. Beck ed., 2001 repl. vol.).

do not needlessly interfere; instead, they prevent market-generated externalities from destroying the property rights of third parties. These protections are the minimum needed to ensure that all owners transfer their property rights only through markets.[149] Because of such concerns, small-scale transfers of water rights among nearby farmers or ranchers, all of whom make similar uses at more or less the same place, such that transfers are unlikely to affect third parties, are the only transfers that regularly occurred under appropriative rights without state intervention.[150] The only large-scale transactions involving a significant change in the place or manner of use that can occur purely by market transactions transpire when the transferor was the last beneficial user of the water. Moreover, under a market system for water without protections for third parties, wealth generally is transferred from the poorest water users, who hold the smallest water rights or no water rights at all, to the wealthier members of society.[151] Those who can afford to buy water rights no longer need to worry about compensating small water users who lose their expected return flows.

C. Regulated Riparianism

Since the 1950s, Hawaii and about half of the states east of Kansas City have enacted administrative permit systems to replace traditional riparian rights.[152] The Mississippi experience, to be described below, illustrates why these states developed a regulated system of water administration based on riparian principles, best described as a system of public property, rather than importing appropriative rights

149. *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 87-88 (5th ed. 1998); *see also* Jeffrey L. Jordan, *Externalities, Water Prices, and Water Transfers*, 35 J. AM. WATER RESOURCES ASS'N 1007 (1999).

150. *See* sources cited *supra* note 138.

151. *See* Carl J. Bauer, *Slippery Property Rights: Multiple Water Uses and the Neoliberal Model in Chile, 1981-1995*, 38 NAT. RESOURCES J. 109, 149 (1998); K. William Easter & Robert Hearne, *Water Markets and Decentralized Water Resources Management: International Problems and Opportunities*, 31 WATER RESOURCES BULL. 9, 12 (1995) (the delivery of water services takes on characteristics of a natural monopoly where the price of water may be low when trying to exclude competitors but that it becomes vastly more expensive without competition). *See generally* CARL J. BAUER, AGAINST THE CURRENT: PRIVATIZATION, WATER MARKETS, AND THE STATE IN CHILE (1998).

152. *See* Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-5 to 9-6, 9-36.

into the east.[153] The Connecticut Supreme Court recently became the first court to adopt the name I coined for this system about 20 years ago: "regulated riparianism."[154]

The transition from extremely limited regulatory intervention to more or less comprehensive regulation often occurred incrementally rather than from a conscious design to revolutionize the system of water rights. As a result, there is disagreement over when to date the emergence of a true regulated riparian system, and even today one could debate whether certain states have crossed the boundary from relying largely on unregulated common law riparian rights to a regulated riparian system. With those caveats in mind, one can identify about 18 states that have enacted a regulated riparian system.[155] In addition, four states apply a regulated riparian system to groundwater without applying it to surface waters.[156] The Delaware Basin Water Commission and the Susquehanna Basin Water Commission also operated a limited regulated riparian system in the parts of the states to which they apply, especially within parts of Pennsylvania.[157]

Most authors writing about regulated riparianism describe the regulated riparian statutes as a set of minor modifications

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153. *See infra* Part III; *see also* Dellapenna, *Dual Systems*, *supra* note 64, at 8-73 to 8-75; Dellapenna, *Water Allocation*, *supra* note 5, at 29-31.

154. City of Waterbury v. Town of Washington, 800 A.2d 1102, 1155 (Conn. 2002). On the origin of the term "regulated riparianism" or "regulated riparian rights," see Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-7.

155. ALA. CODE §§ 9-10B-1 to 9-10B-30 (2001); ARK. CODE ANN. §§ 15-22-201 to 15-22-622 (LEXIS 2003); CONN. GEN. STAT. §§ 22a-365 to 22a-380 (1995); DEL. CODE ANN. tit. 7, §§ 6001-6031 (2001); FLA. STAT. ANN. §§ 373.012 to 373.619 (West 2002); O.C.G.A. §§ 12-5-31, 12-5-90 to -107 (2001); HAW. REV. STAT. §§ 174C-1 to 174C-101 (1993); IOWA CODE ANN. §§ 455B.261 to 455B.281 (West 1997); KY. REV. STAT. ANN. §§ 151.010 to 151.600, 151.990 (LEXIS 2001); MD. CODE ANN., ENVIR. §§ 5-501 to 5-514 (1996); MASS. GEN. LAWS ch. 21G, §§ 1-19 (2002); MINN. STAT. ANN. §§ 103G.001 to 103G.315 (West 1997); MISS. CODE ANN. §§ 51-3-1 to 51-3-55 (1999); N.J. STAT. ANN. §§ 58:1A-1 to 58:1A-17 (West 1992); N.Y. ENVTL. CONSERV. LAW §§ 15-1501 to 15-1529 (McKinney 1997); N.C. GEN. STAT. §§ 143-215.11 to 143-215.22K (2003); VA. CODE ANN. §§ 62.1-242 to 62.1-253 (LEXIS 2001); WIS. STAT. ANN. §§ 30.18, 30.28, 30.292 to 30.298, 281.35 (West 1998).

156. ARIZ. REV. STAT. ANN. §§ 45-401 to 45-655 (West 2003); 525 ILL. COMP. STAT. ANN. §§ 45/1 to 45/7 (West 1993); NEB. REV. STAT. §§ 46-656.01 to 46-656.67, 46-675 to 46-692 (1998); S.C. CODE ANN. §§ 49-5-10 to 49-5-150 (Law. Co-op. 1987 & West Supp. 2001). *See generally* Joseph W. Dellapenna, *The Regulated Riparian Approach to Groundwater*, *in* 3 WATERS AND WATER RIGHTS 23-1 to 23-97 (Robert E. Beck ed., 2003 repl. vol.).

157. Pub. L. No. 91-575, 84 Stat. 1509 (1970); *see* Joseph W. Dellapenna, *The Delaware and Susquehanna River Basins*, *in* 6 WATERS AND WATER RIGHTS 137 (Robert E. Beck ed., 1994 repl. vol.).

superimposed on the riparian rights, which they see as remaining the core of the water allocation law in these states.[158] Others have construed regulated riparian statutes as inartfully drafted appropriative rights statutes.[159] Few commentators realized that regulated riparianism represents a truly different model of water law—one that treats water as public property instead of common or private property.[160] I base the following summary description of regulated riparianism on the common core of principles found in the actual regulated riparian statutes and articulated in the *Regulated Riparian Model Water Code* ("*Model Code*") of the American Society of Civil Engineers.[161] No state has a system precisely like the one described here or in the *Model Code*, although several come very close. In this Article, I refer to the *Model Code* where relevant for the points mentioned and to the relevant chapter of my contributions to the treatise *Waters and Water Rights*. These are the most convenient sources for information on the structure and application of regulated riparianism. Both include detailed commentaries explaining the various provisions and exhaustive references to actual regulated riparian statutes.

The most fundamental departure from common law riparian rights under regulated riparianism is a general requirement that people are not to withdraw water without a time-limited permit from the state within which the withdrawal occurs.[162] The permits determine water rights, not the riparian nature of the use.[163] Often one of the principle motives for enacting a regulated riparian statute was to create legal authority for the use of water on non-riparian land.[164]

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158. *See, e.g.*, Richard Ausness, *Water Rights Legislation in the East: A Program for Reform*, 24 WM. & MARY L. REV. 547, 547 (1982-83).

159. *See, e.g.*, George William Sherk, *Eastern Water Law*, 1 NAT. RESOURCES & ENVT. 7 (1986); Frank J. Trelease, *A Water Management Law for Arkansas*, 6 U. ARK. LITTLE ROCK L.J. 369 (1983).

160. Dellapenna, *Adapting Riparian Rights*, *supra* note 57, at 551, 585; Dellapenna, *Water Allocation*, *supra* note 5, at 33-34.

161. AMERICAN SOC'Y OF CIVIL ENG'RS, THE REGULATED RIPARIAN MODEL WATER CODE (ASCE Standard 40-03, Joseph W. Dellapenna ed. 2003) [hereinafter MODEL CODE].

162. *See* MODEL CODE, *supra* note 161, § 6R-1-01; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-40 to 9-48, 9-57 to 9-62.

163. *See* Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-40 to 9-48.

164. *See* MODEL CODE, *supra* note 161, § 2R-1-02; Dellapenna, *Regulated Riparinanism*, *supra* note 68, at 9-46 to 9-48.

The statutes are still within the riparian tradition because the criterion by which states decide permit applications is whether the proposed use is "reasonable."[165] Under regulated riparianism, courts apply the criterion of "reasonableness" very differently than at common law.[166] Most importantly, an administering agency decides before a use begins whether it is reasonable, both in terms of general social policy and in terms of the effects of the proposed use on other permitted uses.[167] This difference has significant advantages for water users because they know—at least for the duration of the permit—whether their use is reasonable; a judicial decision that wipes out their investment without compensation cannot catch them unaware.[168] The permit allows a potential investor to gauge whether the investment will be profitable and informs the potential investor about the proper scale of the investment.[169]

Regulated riparian systems require the administering agency to design permits to protect other lawful users and public values.[170] The statutes often contain preferences for certain classes of uses.[171] Regulated riparian systems accord temporal priority a strictly limited role in the permit process.[172] Finally, the administering agencies issue permits for only a specific period of time—ranging, depending on the state, from three to twenty years.[173] When a permit expires, the administering agency is charged to re-examine the continued

165. *See* MODEL CODE, *supra* note 161, §§ 2R-1-01, 2R-2-20, 6R-3-01, 6R-3-02; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-95 to 9-105; Fortuna, *supra* note 2, at 1024-25. Some jurisdictions substitute the terms "beneficial," "reasonable-beneficial," or "equitable" for "reasonable." Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-105 to 9-109.

166. *See* Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-95 to 9-115.

167. *See* MODEL CODE, *supra* note 161, §§ 6R-2-01 to 6R-2-08, 6R-3-02, 6R-3-05; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-62 to 9-70, 9-96 to 9-109.

168. This can happen under traditional riparian rights; *see, e.g.*, Joslin v. Marin Mun. Water Dist., 429 P.2d 889, 895-98 (Cal. 1967); Harris v. Brooks, 283 S.W.2d 129, 135 (Ark. 1955).

169. *See generally* Dellapenna, *Regulated Riparianism*, *supra* note 68, 9-62 to 9-70.

170. *See generally* MODEL CODE, *supra* note 161, § 7R-1-01; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-62 to 9-70, 9-142 to 9-165.

171. *See* MODEL CODE, *supra* note 161, §§ 6R-1-02, 6R-3-04; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-48 to 9-56, 9-161 to 9-165.

172. *See* MODEL CODE, *supra* note 161, §§ 6R-1-03, 6R-3-02 (setting the duration of most permits for 20 years); Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-110 to 9-113.

173. *See* MODEL CODE, *supra* note 161, § 7R-1-02; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-57 to 9-62.

reasonableness of authorized uses, introducing a desirable flexibility into the development, use, and protection of water resources.[174]

Regulated riparian statutes contain elaborate enforcement provisions, including criminal penalties, civil penalties, injunctions, administrative orders, and actions for public and private damages.[175] These statutes also provide for hearings within the agency and for judicial review of agency decisions.[176] The *Model Code* also includes provisions designed to support alternative dispute resolution and the administrative resolution of disputes among permit holders not generally found in actual regulated riparian statutes.[177]

Some of the regulated riparian statutes require water users to pay fees to the agency for the permits.[178] Statutes that set a uniform charge irrespective of the use's nature or of the amount of water used clearly do not charge for the water used.[179] Even when the fee is variable, however, it is set according to the presumed ability of the user to pay, rather than according to the value that could be created through use of the water.[180] The *Model Code* breaks new ground in this respect, requiring water use fees that, to some extent, reflect the use value of the water.[181]

The states' police power to regulate water withdrawal and use to protect the public health, safety, and welfare provides the basis for these extensive regulations.[182] Still, fear of the political, and perhaps

174. MODEL CODE, *supra* note 161, § 7R-1-02 cmt.

175. *See id.* §§ 5R-4-03 to 5R-5-03; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-70 to 9-82.

176. *See* MODEL CODE, *supra* note 161, §§ 5R-1-01 to 5R-1-03, 5R-3-01 to 5R-3-03. Courts generally are very deferential in reviewing agency decisions under regulated riparian statutes. *See, e.g.*, City of Fort Smith v. River Valley Reg'l Water Dist., 37 S.W.3d 631, 639-40 (Ark. 2001); Southwest Fla. Water Mgmt. Dist. v. Charlotte County, 774 So. 2d 903, 910 (Fla. Dist. Ct. App. 2001); Southwest Fla. Water Mgmt. Dist. v. Save the Manatee Club, Inc., 773 So. 2d 594, 597 (Fla. Ct. App. 2000); *In re* Water Use Permit Applications, 9 P.3d 409, 431 (Haw. 2000); *In re* Erickson Lake, 392 N.W.2d 636, 639-40 (Minn. Ct. App. 1986); *In re* Comm'r's Order Denying Permit Application, 527 N.W.2d 173, 175, 177 (Minn. Ct. App. 1995), *rev. denied.*

177. MODEL CODE, *supra* note 161, § 5R-2-01 to 5R-2-03; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-786, 9-113 to 9-115.

178. *See* Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-82 to 9-87.

179. *See id.*

180. *See id.*

181. MODEL CODE, *supra* note 161, § 4R-1-08.

182. *See* State v. Braun, 378 A.2d 640 (Del. 1977); Iowa Natural Res. Council v. Van Zee, 158 N.W.2d 111, 116 (Iowa 1968); Crookston Cattle Co. v. Minn. Dep't of Natural Res., 300 N.W.2d 769,

the legal, repercussions of interference with traditional water rights has led many state legislatures to exempt large classes of users from the permit requirement—users (often farmers) who were using water when the new statute came into effect.[183] This exemption introduces a significant temporal element. A more sophisticated solution to this problem guarantees existing users an initial permit but does not guarantee a renewal permit after the expiration of the first permit cycle.[184] The law can conclusively presume that existing users who refuse to apply for a permit within a relatively short period of time have abandoned their claim.[185]

Regulated riparian statutes also include provisions for protecting and for implementing the public interest in water resources, beginning with requirements for long-term planning.[186] A major purpose of the permit requirement is to gather necessary information to enable this planning to occur on an on-going basis. The *Model Code* would establish a comprehensive statewide data system.[187] These statutes usually give the administering agency broad discretion to plan for and to deal with crises brought on by extreme water shortages.[188] The agency can incorporate permit conditions based on its plans.[189]

During a water crisis, the legislation usually authorizes the administering agency to restrict uses either according to pre-announced plans or independently of these plans should the agency's plans be inadequate to deal with the actual shortage, notwithstanding

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776 (Minn. 1980); Herschman v. State, 225 N.W.2d 841, 844 (Minn. 1975); State v. Kuluvar, 123 N.W.2d 699, 704-05 (Minn. 1963); Omernik v. State, 218 N.W.2d 734, 743 (Wis. 1974); Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-120 to 9-135.

183. Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-48 to 9-56, 9-110 to 9-113. For the Georgia version of the agricultural exemption, see O.C.G.A. §§ 12-5-31(a)(3), 12-5-105(a) (2001).

184. *See* MODEL CODE, *supra* note 161, § 6R-1-03; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-111 to 9-112.

185. *Cf.* United States v. Locke, 471 U.S. 84, 89-90 (1985) (cutting off mining claims); *In re* Deadman Creek Drainage Basin, 694 P.2d 1071, 1072 (Wash. 1985) (cutting off riparian rights in favor of appropriative rights).

186. *See* MODEL CODE, *supra* note 161, §§ 4R-2-01 to 4R-2-04; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-142 to 9-150.

187. *See* MODEL CODE, *supra* note 161, § 4R-2-03.

188. *Id.* §§ 7R-3-01 to 7R-3-07; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-165 to 9-172.

189. MODEL CODE, *supra* note 161, § 7R-1-01.

any inconsistency between these measures and a permit.[190] The agency makes the decisions according to what restrictions are most reasonable in light of the actual situation.[191] Administering agencies seem to prefer to use temporal priority or *pro rata* sharing as the allocative methods least likely to provoke litigation or other difficulties for the agency.[192] This preference sabotages the whole scheme of regulated riparianism because it relies on expert appraisal of which uses will best serve the needs of society and eschews any simple rule of allocation without evaluation of social utility.

In eastern states, the main threats to the availability of water often are the result of qualitative changes in the water rather than true shortages. Regulated riparian statutes address these problems in two ways that are very different from statutory provisions in appropriative rights states. First, most regulated riparian states vest both the management of water allocation and water quality issues in a single agency charged with granting permits in consideration of both sets of policies.[193] Second, regulated riparian codes usually go far beyond appropriative rights law and traditional riparian rights in protecting minimum flows.[194] Provisions may authorize other kinds of conditions designed to protect aesthetic or ecological concerns. For example, the *Model Code* requires the protection of the biological, chemical, and physical integrity of the water source in every permit, defined in terms of federal and other relevant legal standards.[195]

Two unsolved problems in regulated riparian statutes relate to the security of investment and the transfer of water to higher valued uses. Investment security could be a problem if the time period of a permit is too short, leaving too little time for a permit holder to recover the cost of a project before the permit expires.[196] Additional uncertainty

190. *See* MODEL CODE, *supra* note 161, § 7R-3-01.

191. MODEL CODE, *supra* note 161, § 7R-3-01 cmt.

192. *See* Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-148.

193. MODEL CODE, *supra* note 161, §§ 4R-3-04, 6R-4-04.

194. *See* MODEL CODE, *supra* note 161, § 3R-1-01 to -2-05; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-150 to 9-161.

195. MODEL CODE, *supra* note 161, § 3R-2-03.

196. *See* MALONEY ET AL., *supra* note 88, at 175-77; NAT'L WATER COMM'N, WATER POLICIES FOR THE FUTURE 286-87 (1973), Ausness, *supra* note 158, at 585-87; Dellapenna, *Regulated Riparianism*, *supra* note 68, 9-58 to 9-59; Gould, *supra* note 138, at 109-10.

could arise when the administering agency has the power to modify permits in light of unforeseen water shortages.[197] In the actual operation of regulated riparian systems, however, administering agencies are sensitive to the concerns of large institutional investors in water.[198] Administering agencies seldom refuse to renew a permit outright, although agencies sometimes attach new and more stringent conditions at the time of renewal. Administering agencies generally consult with major water users in crafting responses to water emergencies rather than making independent determinations regarding the matter.[199] States also need to consider the cost of imposing an elaborate administrative system, and they might elect to limit their regulated riparian system only to certain water basins or to other areas where the competition for water is most intense.[200]

Usually regulated riparian statutes make no express provision for the transfer of water rights or permits between potential users.[201] The *Model Code* charges the administering agency to encourage market transfers of water.[202] Given the dearth of markets under appropriative rights, however, it remains unclear whether a market could develop to facilitate the transfer of water used under regulated riparian permits to higher valued uses.[203] Theoretically, one purpose of the regulated

197. *See* Ausness, *supra* note 158, at 582; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-165 to 9-172; Gould, *supra* note 138, at 110, 117-21.

198. Evidence suggests that in actual practice agencies exercise their managerial powers too cautiously rather than too aggressively. *See, e.g.*, Alexander Lane, *N.J. Too Generous with Water, Critics Say—State Permits for Big Users Rose Last Year*, STAR-LEDGER (Newark, N.J.), Sept. 28, 2003, at 21 (reporting increases in authorized water withdrawals during a major drought).

199. *See, e.g.*, Tom Avril, *There Are No Limits on Biggest Water Users: Drought Rules Don't Apply to Industry and Farms. Officials Say Jobs Could Be at Stake*, PHILA. INQUIRER, Mar. 11, 2002, at A1; Tom Avril & Edward Colimore, *The Drought and How We Got There: Lack of Rain a Factor; So Is Poor Planning*, PHILA. INQUIRER, Apr. 14, 2002, at A1; Greg Bouwer, *Water Resources: East Coast Drought Could Challenge Outdated Plans*, CIV. ENG'G, Apr. 2002, at 30; John-Thor Dahlburg, *Drought Compounded by Error in Judgment*, PHILA. INQUIRER, Apr. 22, 2001, at A21; Lesley-Ann Dupigny-Giroux, *Towards Characterizing and Planning for Drought in Vermont*, 37 J. AM. WATER RESOURCES ASS'N 505, 524 (2001); Lane, *supra* note 198.

200. *See* NAT'L WATER COMM'N, *supra* note 196, at 280; Robert H. Abrams, *Water Allocation by Comprehensive Permit Systems in the East: Considering a Move Away from Orthodoxy*, 9 VA. ENVTL. L.J. 255, 284-85 (1990); Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-42 to 9-46.

201. Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-115 to 9-120.

202. *See* MODEL CODE, *supra* note 161, §§ 1R-1-07, 7R-2-01 to 7R-2-04, 7R-3-05, 9R-1-01, 9R-1-02.

203. On the dearth of true markets for water, see generally Dellapenna, *Getting Names Right*, *supra* note 25; Howe et al., *supra* note 123. Regarding the likely dearth of markets for water permits under regulated riparianism, see Gould, *supra* note 138, at 110.

riparian system is to enable the administering agencies to force these transfers through the non-renewal of permits.[204] In practice, however, the agencies free up far less water through the renewal process than theory suggests because the agencies prefer to tighten conditions on existing uses rather than to deny renewals outright.[205] Non-renewal of permits will likely remain an infrequent and cumbersome device unless states are willing to create a good deal of investment insecurity.

Preferential fees based on relative inability to pay rather than the value of the use are a form of distributive equity.[206] This equity arguably justifies exemptions from the permit requirement or other preferences conferred on small users or on other users unable to pay for the full value of the water they need. The result, however, will be the continued use of water for low-valued uses rather than its transfer to higher valued uses that, in extreme cases, will not have water available for their needs.

III. WHY REGULATED RIPARIANISM WORKS BETTER THAN APPROPRIATIVE RIGHTS IN THE EAST

The Pacific Coast States, from Alaska to California, and the High Plains States, from North Dakota to Texas, all eventually adopted appropriative rights along with, or as a replacement for, riparian rights. Instead of compensating the owners of riparian rights, these states preserved uses that existed on the effective date of their first appropriative rights statutes as valid riparian rights and abolished "unused riparian rights."[207] Even though most transitions occurred

204. *See* MODEL CODE, *supra* note 161, § 7R-1-02.

205. *See* Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-61 to 9-62.

206. *Id.* at 9-83.

207. *See* California-Oregon Power Co. v. Beaver Portland Cement Co., 295 U.S. 142, 155-58 (1935); Pacific Power Co. v. Bayer, 273 U.S. 647 (1926); F. Arthur Stone & Sons v. Gibson, 630 P.2d 1164, 1168-70 (Kan. 1981); Hickman v. Loup River Pub. Power Dist., 113 N.W.2d 617, 621 (Neb. 1962); Baeth v. Hoisveen, 157 N.W.2d 728, 731 (N.D. 1968); City of Stillwater v. Okla. Water Res. Bd., 524 P.2d 938, 941, 943 (Okla. 1974); *In re* Hood River, 227 P. 1065, 1070-71 (Or. 1924); Belle Fourche Irrigation Dist. v. Smiley, 176 N.W.2d 239, 245-46 (S.D. 1970); Knight v. Grimes, 127 N.W.2d 708, 709-10 (S.D. 1964); *In re* Deadman Creek, 694 P.2d 1071, 1073-74 (Wash. 1985). *But see* Franco-Am.

when relatively few water uses existed, the result was a dual system that combined the worst features of both bodies of law.[208]

Mississippi is the only state east of Kansas City to adopt a dual system.[209] Twenty-nine years later, in 1985, Mississippi repealed its appropriative rights law, replacing it with a regulated riparian statute.[210] During the years that Mississippi had an appropriative rights statute on the books, no court in Mississippi ever referred to the statute in deciding a water rights dispute.[211]

Basically, the reason for the failure of appropriative rights in Mississippi lies in the innumerable consumptive uses of water that began in Mississippi before 1955.[212] Claiming an appropriative right would only concede priority to an opponent claiming one of these riparian rights. Either the riparian right would prevail as the earliest appropriation,[213] or the appropriative right would be a permissive non-riparian use that must fail in competition with a riparian use.[214] The best that an appropriator could hope for was that the court would balance the appropriative use against the complaining riparian's use, which brings us back full circle to the reasonable use version of riparian rights.[215] If an acute general water shortage developed, an appropriator, rather than having a more secure title than a riparian, would not find water to apply to the appropriation. When Mississippi repealed its appropriative rights statute, it gave all persons claiming rights vested under the appropriation statute one year to file a

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Charolaise, Ltd. v. Okla. Water Res. Bd., 855 P.2d 568, 575-77 (Okla. 1990) (holding that an attempt to cut-off unused riparian rights is void as an attempt to take property without compensation).

208. *See generally* Dellapenna, *Dual Systems*, *supra* note 64, at 8-40 to 8-72.

209. *See id.* at 8-72 to 8-76; Dellapenna, *Water Allocation*, *supra* note 5, at 29-31.

210. *See* Dellapenna, *Dual Systems*, *supra* note 64, at 8-73.

211. *See id.*; Dellapenna, *Water Allocation*, *supra* note 5, at 30.

212. Dellapenna, *Water Allocation*, *supra* note 5, at 30.

213. *See* Dellapenna, *Dual Systems*, *supra* note 64, at 8-68 to 8-69; Dellapenna, *Water Allocation*, *supra* note 5, at 30.

214. *See* Dellapenna, *Dual Systems*, *supra* note 64, at 8-69 to 8-72.

215. *See* Franco-Am. Charolaise, Ltd. v. Okla. Water Res. Bd., 855 P.2d 568, 572-78 (Okla. 1990); Dellapenna, *Dual Systems*, *supra* note 64, 8-71 to 8-72; Dellapenna, *Water Allocation*, *supra* note 5, at 30.

document expressing the intent to preserve their appropriative right.[216] No one filed one of these documents.[217]

In place of the repealed appropriative statute, Mississippi enacted a fairly standard regulated riparian statute.[218] Whether one thinks regulated riparian statutes work well or poorly, they at least suffer none of the infirmities that bedevil the introduction appropriative rights in place of riparian rights in a mature, economically developed state.[219] Because they build upon and regulate existing riparian rights, they are not a taking of property.[220] A well-designed regulated riparian system therefore will bring within its scope all significant water users and it will treat them all equally in terms of the criteria within the statute.[221] Grandfathered rights simply should not survive a single permit cycle.[222] Thus, it should be no surprise that every eastern state other than Mississippi moved straight to regulated riparianism without experimenting with the appropriative rights option.

CONCLUSION

This analysis leads to the bottom line: Is a regulated riparian system worth its costs? Clearly, states will incur significant financial costs in administering a regulated riparian system, compounded by the tendency of government bureaucracies to replicate their errors throughout the state. Given the increasing failure of traditional riparian rights to cope with the needs of modern societies and taking into account the only slightly better performance of appropriative

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216. Dellapenna, *Water Allocation*, *supra* note 5, at 31; MISS. CODE ANN. §§ 51-3-5(2) to -5(3), 51-3-29(b) (1999).

217. Dellapenna, *Water Allocation*, *supra* note 5, at 31.

218. MISS. CODE ANN. §§ 51-3-1 to 51-3-9 (1999).

219. Dellapenna, *Dual Systems*, *supra* note 64, at 8-74 to 8-75.

220. *See* Village of Tequesta v. Jupiter Inlet Corp., 371 So. 2d 663 (Fla. 1979), *cert. denied*, 444 U.S. 965 (1979); Crookston Cattle Co. v. Minnesota Dep't of Nat. Resources, 300 N.W.2d 769 (Minn. 1981); Omernik v. State, 218 N.W.2d 734 (Wis. 1974); Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-120 to 9-135.

221. Omernik v. State, 218 N.W.2d 734, 741-42 (Wis. 1974); Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-135 to 9-138.

222. *See* MODEL CODE, *supra* note 161, § 6R-1-03; Dellapenna, *Regulated Riparianism*, *supra* note 68, at 9-111.

rights, there is little choice but to move to a regulated riparian system. Regulated riparianism is not a perfect system, but it appears to be the best-suited approach to the cultural, economic, legal, hydrologic, and political settings of eastern states.